

APPLICANT'S REPLY BRIEF

This Reply Brief is filed by Applicant in response to the Examiner's Answer dated July 13, 2005.

I. STATUS OF CLAIMS

The Examiner correctly states that the statement of the status of claims contained in Applicant's Appeal Brief is correct. However, on page 2 of his answer, the Examiner incorrectly lists which claims are involved in this appeal. As stated on the second page of Applicant's Appeal Brief, the claims involved in this appeal are claims 37-59.

II. REPLY TO EXAMINER'S ARGUMENTS REGARDING §103 REJECTION

As noted by the Examiner, the primary reference, U.S. Patent No. 6,248,396 to Helf (Helf), fails to teach or suggest performing a stability test or a fatigue test. U.S. Patent No. 3,907,582 to Walter (Walter) is cited for teaching that stability tests have been performed. U.S. Patent No. 5,306,750 to Goodrich et al. (Goodrich) is cited for teaching that fatigue tests have been performed.

What Applicant has invented is using stability and fatigue tests to select an asphalt mixture for making an interlayer in an interactive design process. Neither Walter nor Goodrich suggests the desirability of performing stability and fatigue tests, in particular, on a proposed asphalt mixture and using that information to select an asphalt mixture for making an interlayer. The fact that one reference teaches performing a particular performance test and another reference teaches performing a different performance test in no way suggests that these two performance tests should both be performed on the same asphalt mixture. Further, there is no teaching or suggestion by the cited references that an interactive design process involving performing both a stability test and a fatigue test would be desirable for creating an interlayer.

A. No Motivation to Look to Walter or Goodrich to Improve Helf

There is no motivation from the cited references to look to Walter or Goodrich to improve Helf. Neither Walter nor Goodrich, the two references cited for disclosing performance tests, suggests performance testing as a design technique for formulating an asphalt mixture. Helf would not look to Walter or Goodrich to improve his "flexible aggregate" invention, as Walter and Goodrich do not even suggest the possibility of using "flexible aggregate" in their paving compositions. At Col.3, lines 10-15, Walter mentions using ground tire in an asphalt surface course in describing the prior art but does not suggest using such ground tire in his invented composition. Further, Helf would have no motivation to look to Walter or Goodrich to provide tips or techniques for creating a better interlayer, as neither Walter nor Goodrich even suggests making an interlayer. Accordingly, there is no motivation from the cited references for Helf to look to Walter or Goodrich.

B. No Expectation of Success in Combining Walter and Goodrich with Helf

Even if Helf is combined with Walter and Goodrich, one of ordinary skill in the art would not have a reasonable expectation of successfully achieving Applicant's claimed invention from the teachings and suggestions in these cited references. More specifically, one of ordinary skill in the art would not have a reasonable expectation of success in developing Applicant's claimed method of selecting an asphalt mixture for making an interlayer using the teachings of the cited references.

The claimed invention is specific to selecting an asphalt mixture for creating an interlayer and is not for making other layers of a paved road. Applicant has found that using stability and fatigue tests in an interactive design process allows for the creation of a superior interlayer. One trying to improve upon Helf's slurry used for making a interlayer would have no reason to think that this interlayer could be improved upon by looking to references that do not teach making interlayers. There is no suggestion or motivation from the cited references that Walter's base course with

incinerator waste could be useful in improving Helf's interlayer, and there is no suggestion or motivation from the cited references that Goodrich's new asphalt formulation for paving and roofing applications could be useful in forming an interlayer. Applicant's invention cannot be used as a template to provide the motivation to combine these references.

C. Applicant Did Not Admit that Walter Inherently Reads on "at least about 18" Claim Limitation

On page 10 of his answer, the Examiner mischaracterizes Applicant's argument. Applicant did not state that Walter teaches a higher stability than required by claim 38. Accordingly, Applicant did not admit that Walter inherently reads on the "at least about 18" claim limitation.

Applicant's arguments regarding claim 38 are on page 15 of its Appeal Brief. Applicant expressly says that "Helf in combination with Walter and Goodrich does not disclose or suggest the particular minimum stability claimed by Applicant in claim 38, namely, a Hveem stability at 60°C and 50 gyrations of at least about 18." Applicant goes on to state that Walter, the reference cited for teaching a stability test, does not teach a minimum stability necessary for an interlayer, as claimed by Applicant in claim 38. Please note that in Applicant's characterization that Walter teaches "higher" stability values, the term "higher" is merely relative to the teachings within Walter and is not meant as a comparison with Applicant's claimed invention. In fact, none of the cited references teach or suggest a Hveem stability of at least about 18 for an interlayer, as claimed by Applicant.

D. Applicant's Invention Cannot be Characterized as Stemming from Routine Experimentation

The Examiner overly simplifies the formulation of asphalt mixtures by stating on page 8 of his answer that "Walter teaches that the amount of asphalt controls the Hveem Stability and Goodrich teaches that the amount of polymer controls the Flexural Beam Fatigue." The Examiner

then concludes that "a cause-effective relationship is established that would make [Applicant's] results obvious and achievable through routine experimentation." Applicant respectfully disagrees.

While asphalt amount may affect Hveem stability, the composition of the asphalt and other components in an asphalt mixture also will affect Hveem stability. For example, see Col. 4, lines 51-56 of Walter, which states that compositions containing incinerator residues "are stronger than similar compositions, containing the same amount of asphalt binder, based on blast furnace slag." Because multiple factors affect the Hveem stability of an asphalt mixture, it is incorrect to conclude that a cause-effect relationship between Hveem stability and asphalt amount has been established so as to make Applicant's invention obvious through routine experimentation.

While polymer amount may affect Flexural Beam Fatigue, the composition of the polymer, the composition of the asphalt, and other components in the asphalt mixture also will affect Flexural Beam Fatigue. In fact, see Col. 12, lines 19-27 of Goodrich, which states that the "polymer-linked-asphalt of the present invention, Run Nos. 403 and 404, have superior resistance to fatigue cracking at low initial strains compared to run Nos. 400, 401, and 402.... This is particularly surprising considering the low polymer level of the mixes in Run Nos. 403 and 404." A look at Table V shows that both Run No. 400 with 0% polymer and Run No. 402 with 5% by weight polymer had inferior beam fatigue life compared with Run Nos. 403 and 404, which included 2% and 3% by weight polymer, respectively. Thus, Goodrich's own results clearly indicate that polymer amount alone is not the only thing that affects Flexural Beam Fatigue.

Neither asphalt amount nor polymer amount are result-effective variables. Too many variables are at play when formulating asphalt mixtures to attribute asphalt amount as indicative of Hveem stability or to attribute polymer amount as indicative of Flexural Beam Fatigue.

Accordingly, it took Applicant more than routine experimentation to determine Hveem stability and

Flexural Beam Fatigue criteria for an interlayer. See M.P.E.P. 2144.05 (II.B.) (A particular parameter must first be recognized as a result-effective variable, i.e., a variable which achieves a recognized result, before the determination of the optimum or workable ranges of said variable might be characterized as routine experimentation. *In re Antonie*, 559 F.2d 618, 195 U.S.P.Q. 6 (C.C.P.A. 1977)).

E. Numerous Claim Limitations are Not Taught by Any of the Cited References

One of the requirements for establishing a *prima facie* case of obviousness under 35 U.S.C. §103, is that the prior art reference(s) must teach or suggest all of the claim limitations. M.P.E.P. 706.02(j). This teaching or suggestion must be found in the prior art and not based on Applicant's disclosure. The following claim limitations are not taught or suggested by any of the cited references.

1. Claims 37, 40 and 41

Neither Helf, nor Walter, nor Goodrich, nor the combination thereof discloses or suggests "selecting an asphalt mixture for said interlayer... based on stability and fatigue performance" of a tested asphalt mixture, as claimed by Applicant in claims 37, 40, and 41. The Examiner suggests that such a selection method could be achieved by combining all three references. However, even if all three references are combined, an interactive design method for making an interlayer based on performance testing is not suggested. There is no suggestion from the cited references of testing the same asphalt mixture for both stability and fatigue performance. Further, there is no suggestion from these references that stability and fatigue performance should be used as a basis for selecting an asphalt mixture for an interlayer.

2. Claim 38

Neither Helf, nor Walter, nor Goodrich, nor the combination thereof discloses or suggests an asphalt mixture having "a Hveem Stability at 60°C and 50 gyrations of at least about 18," as claimed by Applicant in claim 38. The Examiner suggests this number could be achieved through experimentation and optimization. Applicant respectfully disagrees. The only cited reference that even discloses making an interlayer teaches that it is made from a slurry, and an interlayer made from a slurry would not have the claimed Hveem stability. Further, Walter, the reference that is cited for disclosing a stability test, does not teach a minimum stability necessary for an interlayer, as claimed in claim 38.

3. Claim 39

Neither Helf, nor Walter, nor Goodrich, nor the combination thereof discloses or suggests an asphalt mixture having "a Flexural Beam Fatigue of at least about 100,000 cycles at 2000 microstrains, 10Hz, about 2-4% air voids, and at a temperature of about 0 to 30°C," as claimed by Applicant in claim 39. The only reference that is cited to suggest testing fatigue, Goodrich, does not teach or suggest fatigue values of at least about 100,000 cycles at 2000 microstrains.

4. Claim 42

Neither Helf, nor Walter, nor Goodrich, nor the combination thereof discloses or suggests selecting a binder "for making said at least one asphalt mixture after performing and based on said shear modulus, strain tolerance and bending creep stiffness measurements" of a polymer-modified binder, as claimed by Applicant in claim 42. None of the cited references suggests using these three particular performance tests on the same binder to aid in the selection of a desirable binder for making an interlayer.

5. Claim 43

Neither Helf, nor Walter, nor Goodrich, nor the combination thereof discloses or suggests "selecting said binder for making said at least one asphalt mixture after performing and based on said rotational viscosity measurement," as claimed in claim 43. None of the cited references suggests measuring rotational viscosity so as to help in the selection of a desirable binder for making an interlayer.

6. Claim 44

Neither Helf, nor Walter, nor Goodrich, nor the combination thereof discloses or suggests "selecting said asphalt mixture for said interlayer after performing said volumetric testing and based on volumetric performance of said at least one asphalt mixture," as claimed by Applicant in claim 44. The cited references alone or in combination do not disclose or suggest volumetric testing, stability testing, and fatigue testing a proposed asphalt mixture so as to aid in the design process of making an asphalt mixture for an interlayer.

7. Claim 45 and 47-52

Neither Helf, nor Walter, nor Goodrich, nor the combination thereof discloses or suggests "selecting an asphalt mixture for an interlayer... based on stability and fatigue performance" of a tested asphalt mixture, and "applying said selected asphalt mixture as said interlayer to said roadway," as claimed by Applicant in claims 45 and 47-52. The Examiner suggests that such a selection method could be achieved by combining all three references. However, even if all three references are combined, an interactive design method for making an interlayer based on performance testing is not suggested. There is no suggestion from the cited references of testing the same asphalt mixture for both stability and fatigue

performance. Further, there is no suggestion from these references that stability and fatigue performance should be used as a basis for selecting an asphalt mixture for an interlayer.

8. Claim 46

Neither Helf, nor Walter, nor Goodrich, nor the combination thereof discloses or suggests applying an interlayer "at a temperature above about 140°F" and cooling it "to below about 140°F before applying said overlay," as claimed by Applicant in claim 46. The combination of Helf, Walter and Goodrich does not disclose or suggest these particular temperatures claimed in claim 46.

9. Claim 53

Neither Helf, nor Walter, nor Goodrich, nor the combination thereof discloses or suggests "selecting said asphalt mixture for said interlayer after performing said volumetric testing and based on volumetric performance of said at least one asphalt mixture," as claimed by Applicant in claim 53. The cited references alone or in combination do not disclose or suggest volumetric testing, stability testing, and fatigue testing a proposed asphalt mixture so as to aid in the design process of making an asphalt mixture for an interlayer.

10. Claim 54

Neither Helf, nor Walter, nor Goodrich, nor the combination thereof discloses or suggests an interlayer that "is cooled to below about 140°F before releasing said interlayer to traffic," as claimed by Applicant in claim 54. Helf, Walter and Goodrich do not disclose or suggest the temperature at which an interlayer can be exposed to temporary traffic, as claimed in claim 54. Helf, the only cited reference that discloses making an interlayer, does not teach releasing its interlayer to traffic before applying a surface layer.

11. Claim 55

Neither Helf, nor Walter, nor Goodrich, nor the combination thereof discloses or suggests an asphalt mixture having "a Hveem Stability at 60°C and 50 gyrations of at least about 18 and a Flexural Beam Fatigue of at least about 100,000 cycles at 2000 microstrains, 10Hz, about 2-4% air voids, and at a temperature of about 0 to 30°C," as claimed by Applicant in as claimed by Applicant in claim 55. The Examiner suggests these numbers could be achieved through experimentation and optimization. Applicant respectfully disagrees. The only cited reference that even discloses making an interlayer teaches using substantial amounts of rubber pieces in place of aggregate so as to create an asphalt slurry, which would not have the claimed Hveem stability. Further, Walter, the reference that is cited for disclosing a stability test, does not teach a minimum stability necessary for an interlayer, as claimed in claim 55. The only reference that is cited to suggest testing fatigue, Goodrich, does not teach or suggest fatigue values of at least about 100,000 cycles at 2000 microstrains.

12. Claim 56

Neither Helf, nor Walter, nor Goodrich, nor the combination thereof discloses or suggests an asphalt mixture used to form an interlayer that is made from a "polymer-modified asphalt binder" having "a ductility of at least about 10 cm, at 4°C on RTFO residue at 5 cm/min strain rate when using straight-sided molds," as claimed by Applicant in claim 56. The particular ductility claimed by Applicant is not disclosed or suggested by the cited references.

13. Claim 57

Neither Helf, nor Walter, nor Goodrich, nor the combination thereof discloses or suggests "selecting a binder for making an asphalt mixture... based on said ductility test; providing at least one asphalt mixture comprised of said selected binder and aggregate; ...and selecting an asphalt mixture for said interlayer... based on stability and fatigue performance" of a tested asphalt mixture, as claimed by Applicant in claim 57. The Examiner suggests that such a selection method could be achieved by combining all three references. However, even if all three references are combined, an interactive design method for making an interlayer based on performance testing is not suggested. None of the cited references teaches or suggests the desirability of performing ductility, stability, and fatigue tests with the same design process for selecting an asphalt mixture for making an interlayer, as claimed in claim 57.

14. Claim 58

Neither Helf, nor Walter, nor Goodrich, nor the combination thereof discloses or suggests an asphalt mixture used to form an interlayer that is made from a binder having "a ductility of at least about 10 cm, at 4°C on RTFO residue at 5 cm/min strain rate when using straight-sided molds," as claimed by Applicant in claim 58. The particular ductility claimed by Applicant is not disclosed or suggested by the cited references.

15. Claim 59

Neither Helf, nor Walter, nor Goodrich, nor the combination thereof discloses or suggests an asphalt mixture having "a Hveem Stability at 60°C and 50 gyrations of at least about 18 and a Flexural Beam Fatigue of at least about 100,000 cycles at 2000 microstrains, 10Hz, about 2-4% air voids, and at a temperature of about 0 to 30°C," as claimed by Applicant in as claimed by Applicant in claim 59. The Examiner suggests these numbers

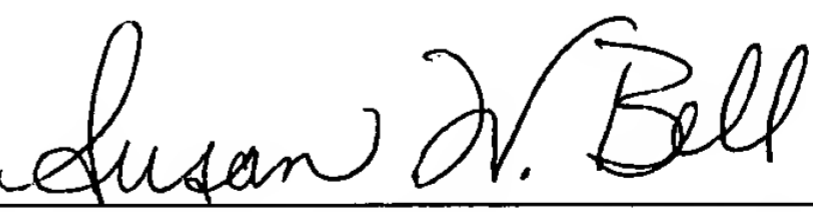
could be achieved through experimentation and optimization. Applicant respectfully disagrees. The only cited reference that even discloses making an interlayer teaches using substantial amounts of rubber pieces in place of aggregate so as to create an asphalt slurry, which would not have the claimed Hveem stability. Further, Walter, the reference that is cited for disclosing a stability test, does not teach a minimum stability necessary for an interlayer, as claimed in claim 59. The only reference that is cited to suggest testing fatigue, Goodrich, does not teach or suggest fatigue values of at least about 100,000 cycles at 2000 microstrains.

The prior art references must teach or suggest all of the claim limitations. M.P.E.P. 706.02(j). As discussed above, the cited references do not accomplish this objective. For these reasons and for further reasons provided in Applicant's Appeal Brief, a *prima facie* case of obviousness has not been established.

III. CLAIMS 37-59 SHOULD BE ALLOWED

For the foregoing reasons and for the reasons submitted in Applicant's Appeal Brief, claims 37-59 should be allowed. It is respectfully submitted that the arguments set forth by the Examiner in his answer do not support a rejection of claims 37-59, and Applicant respectfully requests that the Board overrule the Examiner's rejections.

Respectfully submitted,

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